

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year)

29 August 2000 (29.08.00)

International application No.

PCT/AU99/00826

Applicant's or agent's file reference

International filing date (day/month/year)

27 September 1999 (27.09.99)

Priority date (day/month/year)

28 September 1998 (28.09.98)

Applicant

LEE, Henri, Kwok-Wai

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

09 March 2000 (09.03.00)



in a notice effecting later election filed with the International Bureau on:

CORRECTED  
VERSION

2. The election ☒ was



was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

F. Baechler

Telephone No.: (41-22) 338.83.38

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing:

06 April 2000 (06.04.00)

International application No.:

PCT/AU99/00826

Applicant's or agent's file reference:

International filing date:

27 September 1999 (27.09.99)

Priority date:

28 September 1998 (28.09.98)

Applicant:

LEE, Henri, Kwok-Wai

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International preliminary Examining Authority on:

13 March 2000 (13.03.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer:

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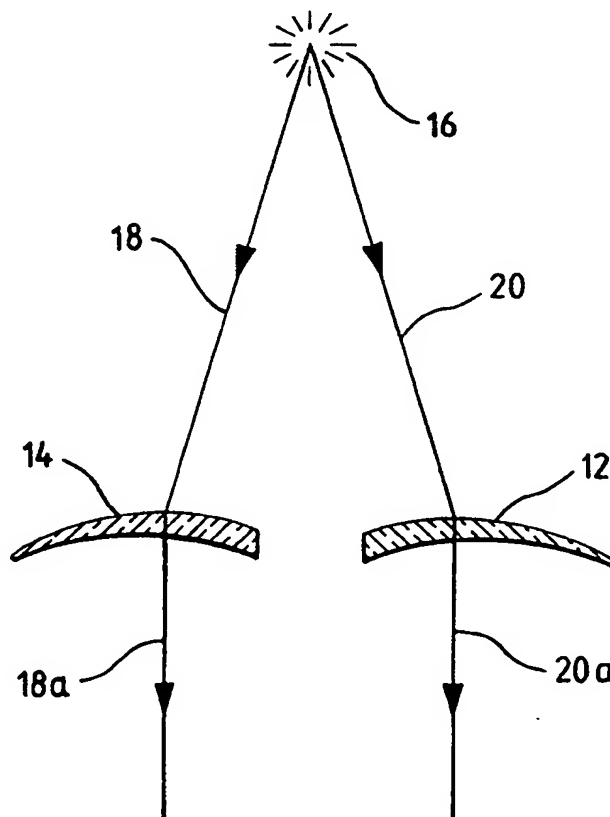
Telephone No.: (41-22) 338.83.38

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>(51) International Patent Classification <sup>6</sup> :</b><br><b>G02B 27/02, G02C 7/02, 7/08</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>A1</b> | <b>(11) International Publication Number:</b> <b>WO 00/19263</b><br><b>(43) International Publication Date:</b> 6 April 2000 (06.04.00)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>(21) International Application Number:</b> PCT/AU99/00826<br><b>(22) International Filing Date:</b> 27 September 1999 (27.09.99)<br><b>(30) Priority Data:</b><br>PP 6180 28 September 1998 (28.09.98) AU<br><b>(71) Applicant (for all designated States except US):</b> POSITIVE PLAN PTY LTD. [AU/AU]; 57 Gedye Street, East Doncaster, VIC 3109 (AU).<br><b>(72) Inventor; and</b><br><b>(75) Inventor/Applicant (for US only):</b> LEE, Henri, Kwok-Wai [AU/AU]; Unit 4, 21 Brougham Street, Box Hill, VIC 3128 (AU).<br><b>(74) Agent:</b> GRIFFITH HACK; Patent & Trade Mark Attorneys, 509 St Kilda Road, Melbourne, VIC 3004 (AU). |           | <b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).<br><br><b>Published</b><br><i>With international search report.</i> |

**(54) Title:** APPARATUS AND METHOD FOR AVOIDING OCULAR MUSCULAR FATIGUE**(57) Abstract**

The present invention provides an apparatus and method for avoiding ocular muscular fatigue, the apparatus comprising a binocular light converging means (12, 14) for converging incident light (18, 20), thereby reducing ocular convergence demand when the apparatus is worn by a user. In a preferred embodiment, the binocular light converging means comprises a pair of lenses.



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Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

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| EE | Estonia                  |    |                                          |    |                                              |    |                          |

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 99/00826

**A. CLASSIFICATION OF SUBJECT MATTER**Int Cl<sup>6</sup>: G02B 27/02, G02C 7/02, 7/08

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC G02B 27/02, G02C 7/02, 7/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
AU: IPC AS ABOVEElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
WPAT, JAPIO**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No.                                      |
|-----------|------------------------------------------------------------------------------------|------------------------------------------------------------|
| X         | EP 362692 A (KELLNER) 11 April 1990. See abstract.                                 | 1,8,9,15-17,21,22,31-33                                    |
| X         | US 5381191 A (LEVY) 10 January 1995. See whole document.                           | 1,8,9,15-17,21,22,31-33                                    |
| X         | US 5204702 A (SHAPIRO) 20 April 1993. See whole document.                          | 1,3,5,6,8,9,15,16,17,19,<br>21,22,28,29,31,32,33,<br>41,42 |

☒ Further documents are listed in the  
continuation of Box C☒ See patent family annex

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search  
26 November 1999Date of mailing of the international search report  
- 3 DEC 1999Name and mailing address of the ISA/AU  
AUSTRALIAN PATENT OFFICE  
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WODEN ACT 2606  
AUSTRALIA  
Facsimile No.: (02) 6285 3929

Authorized officer

**F.C. PEARSON**  
Telephone No.: (02) 6283 2195

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU 99/00826

| C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                    |                         |
|-------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------|
| Category*                                             | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No.   |
| X                                                     | US 5054901 A (KAYE) 8 October 1991. See entire document.                           | 1-4,8,15-21,31,32,38,39 |
| X                                                     | US 4637696 A (WILKINS) 20 January 1987. See whole document.                        | 1,3,8,15-17,19,21,31,32 |

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/AU 99/00826**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

| Patent Document Cited in Search Report |         | Patent Family Member |         |
|----------------------------------------|---------|----------------------|---------|
| EP                                     | 362692  | DE                   | 3834077 |
| US                                     | 5054901 | EP                   | 382446  |
| US                                     | 4637696 | US                   | RE33311 |
|                                        |         | END OF ANNEX         |         |

PATENT COOPERATION TREATY  
**PCT**  
INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D  
29 AUG 2000

|                                                                                                                                       |                                                                          |                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Applicant's or agent's file reference<br>FP11523                                                                                      | <b>FOR FURTHER ACTION</b>                                                | See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416). |
| International application No.<br>PCT/AU99/00826                                                                                       | International filing date ( <i>day/month/year</i> )<br>27 September 1999 | Priority Date ( <i>day/month/year</i> )<br>28 September 1998                                         |
| International Patent Classification (IPC) or national classification and IPC<br><br>Int. Cl. <sup>7</sup> G02B 27/02, G02C 7/02, 7/08 |                                                                          |                                                                                                      |
| Applicant<br><br>POSITIVE PLAN PTY LTD et al                                                                                          |                                                                          |                                                                                                      |

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                 |                                     |                     |    |                          |          |     |                          |                                                                                                  |    |                          |                            |   |                                     |                                                                                                                                                                 |    |                          |                         |     |                          |                                                  |      |                          |                                                       |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------|----|--------------------------|----------|-----|--------------------------|--------------------------------------------------------------------------------------------------|----|--------------------------|----------------------------|---|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------------|-------------------------|-----|--------------------------|--------------------------------------------------|------|--------------------------|-------------------------------------------------------|
| 1.   | This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                 |                                     |                     |    |                          |          |     |                          |                                                                                                  |    |                          |                            |   |                                     |                                                                                                                                                                 |    |                          |                         |     |                          |                                                  |      |                          |                                                       |
| 2.   | <p>This REPORT consists of a total of 3 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 12 sheet(s).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                 |                                     |                     |    |                          |          |     |                          |                                                                                                  |    |                          |                            |   |                                     |                                                                                                                                                                 |    |                          |                         |     |                          |                                                  |      |                          |                                                       |
| 3.   | <p>This report contains indications relating to the following items:</p> <table style="width: 100%;"> <tr> <td style="width: 5%;">I</td> <td style="width: 5%;"><input checked="" type="checkbox"/></td> <td>Basis of the report</td> </tr> <tr> <td>II</td> <td><input type="checkbox"/></td> <td>Priority</td> </tr> <tr> <td>III</td> <td><input type="checkbox"/></td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td>IV</td> <td><input type="checkbox"/></td> <td>Lack of unity of invention</td> </tr> <tr> <td>V</td> <td><input checked="" type="checkbox"/></td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td>VI</td> <td><input type="checkbox"/></td> <td>Certain documents cited</td> </tr> <tr> <td>VII</td> <td><input type="checkbox"/></td> <td>Certain defects in the international application</td> </tr> <tr> <td>VIII</td> <td><input type="checkbox"/></td> <td>Certain observations on the international application</td> </tr> </table> | I                                                                                                                                                               | <input checked="" type="checkbox"/> | Basis of the report | II | <input type="checkbox"/> | Priority | III | <input type="checkbox"/> | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | IV | <input type="checkbox"/> | Lack of unity of invention | V | <input checked="" type="checkbox"/> | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | VI | <input type="checkbox"/> | Certain documents cited | VII | <input type="checkbox"/> | Certain defects in the international application | VIII | <input type="checkbox"/> | Certain observations on the international application |
| I    | <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Basis of the report                                                                                                                                             |                                     |                     |    |                          |          |     |                          |                                                                                                  |    |                          |                            |   |                                     |                                                                                                                                                                 |    |                          |                         |     |                          |                                                  |      |                          |                                                       |
| II   | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Priority                                                                                                                                                        |                                     |                     |    |                          |          |     |                          |                                                                                                  |    |                          |                            |   |                                     |                                                                                                                                                                 |    |                          |                         |     |                          |                                                  |      |                          |                                                       |
| III  | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability                                                                |                                     |                     |    |                          |          |     |                          |                                                                                                  |    |                          |                            |   |                                     |                                                                                                                                                                 |    |                          |                         |     |                          |                                                  |      |                          |                                                       |
| IV   | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Lack of unity of invention                                                                                                                                      |                                     |                     |    |                          |          |     |                          |                                                                                                  |    |                          |                            |   |                                     |                                                                                                                                                                 |    |                          |                         |     |                          |                                                  |      |                          |                                                       |
| V    | <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |                                     |                     |    |                          |          |     |                          |                                                                                                  |    |                          |                            |   |                                     |                                                                                                                                                                 |    |                          |                         |     |                          |                                                  |      |                          |                                                       |
| VI   | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Certain documents cited                                                                                                                                         |                                     |                     |    |                          |          |     |                          |                                                                                                  |    |                          |                            |   |                                     |                                                                                                                                                                 |    |                          |                         |     |                          |                                                  |      |                          |                                                       |
| VII  | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Certain defects in the international application                                                                                                                |                                     |                     |    |                          |          |     |                          |                                                                                                  |    |                          |                            |   |                                     |                                                                                                                                                                 |    |                          |                         |     |                          |                                                  |      |                          |                                                       |
| VIII | <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Certain observations on the international application                                                                                                           |                                     |                     |    |                          |          |     |                          |                                                                                                  |    |                          |                            |   |                                     |                                                                                                                                                                 |    |                          |                         |     |                          |                                                  |      |                          |                                                       |

|                                                                                                                                                                                                                                          |                                                                                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Date of submission of the demand<br>9 March 2000                                                                                                                                                                                         | Date of completion of the report<br>5 July 2000                                   |
| Name and mailing address of the IPEA/AU<br><br>AUSTRALIAN PATENT OFFICE<br>PO BOX 200, WODEN ACT 2606, AUSTRALIA<br>E-mail address: <a href="mailto:pct@ipaaustralia.gov.au">pct@ipaaustralia.gov.au</a><br>Facsimile No. (02) 6285 3929 | Authorized Officer<br><br><b>F.C. PEARSON</b><br><br>Telephone No. (02) 6283 2195 |



**I. Basis of the report****1. With regard to the elements of the international application:\***

- ☐ the international application as originally filed.
- ☒ the description, pages 7,8, as originally filed,  
pages , filed with the demand,  
pages 1-6, received on 23 June 2000 with the letter of 23 June 2000
- ☒ the claims, pages , as originally filed,  
pages , as amended (together with any statement) under Article 19,  
pages , filed with the demand,  
pages 9-14, received on 23 June 2000 with the letter of 23 June 2000
- ☒ the drawings, pages 1,2, as originally filed,  
pages , filed with the demand,  
pages , received on with the letter of
- ☐ the sequence listing part of the description:  
pages , as originally filed  
pages , filed with the demand  
pages , received on with the letter of

**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, was on the basis of the sequence listing:**

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

**4. ☐ The amendments have resulted in the cancellation of:**

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

**5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

|                               |             |     |
|-------------------------------|-------------|-----|
| Novelty (N)                   | Claims 1-46 | YES |
|                               | Claims      | NO  |
| Inventive step (IS)           | Claims 1-46 | YES |
|                               | Claims      | NO  |
| Industrial applicability (IA) | Claims 1-46 | YES |
|                               | Claims      | NO  |

**2. Citations and explanations (Rule 70.7)****Novelty (N) and Inventive Step (IS)**

The invention is directed to apparatus, method and a pair of spectacles for avoiding ocular muscular fatigue using two converging optical elements with certain characteristics as defined in claims 1-4.

This is not shown in the prior art and therefore the claims are novel and inventive



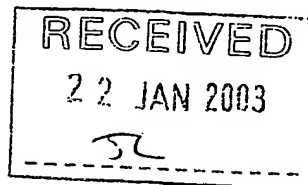
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TX 31651 epo nl  
FAX +31 70 340 3016

Patentamt  
Zweigstelle  
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Lerwill, John  
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235 High Holborn  
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GRANDE BRETAGNE



Datum/Date

22.01.03

|                                                                                          |                                                                                                       |
|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Zeichen/Ref./Ref<br>JL/19949                                                             | Anmeldung Nr./Application No./Demande n°/Patent Nr./Patent No./Brevet n°<br>99950395.6-2217-AU9900826 |
| Anmelder/Applicant/Demandeur/Patentinhaber/Proprietor/Titulaire<br>Positive Plan PTY LTD |                                                                                                       |

## COMMUNICATION

The European Patent Office herewith transmits as an enclosure the European search report for the above-mentioned European patent application.

If applicable, copies of the documents cited in the European search report are attached.

☐ Additional set(s) of copies of the documents cited in the European search report is (are) enclosed as well.

## REFUND OF THE SEARCH FEE

If applicable under Article 10 Rules relating to fees, a separate communication from the Receiving Section on the refund of the search fee will be sent later.





| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                     |                                                                                                                                   |                                                                                                                                                                                                                                                                              |                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Category                                                                                                                                                                                                                | Citation of document with indication, where appropriate, of relevant passages                                                     | Relevant to claim                                                                                                                                                                                                                                                            | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
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| Place of search<br>THE HAGUE                                                                                                                                                                                            |                                                                                                                                   | Date of completion of the search<br>15 January 2003                                                                                                                                                                                                                          | Examiner<br>CALLEWAERT, H                    |
| CATEGORY OF CITED DOCUMENTS                                                                                                                                                                                             |                                                                                                                                   |                                                                                                                                                                                                                                                                              |                                              |
| X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                                                                                   | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                              |

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APPARATUS AND METHOD FOR AVOIDING OCULAR MUSCULAR FATIGUE

The present invention relates to an apparatus and method for the reduction or avoidance of muscular fatigue of the eyes, and is of particular but not exclusive application in avoiding such muscular fatigue encountered during prolonged reading or close use of equipment such as computers.

Existing apparatus for reducing the ill effects to the eyes of prolonged reading or use of computers, or of other activities requiring the intensive, close use of the eyes, include non-prescription spectacles with colour lenses to act as filters 1) to reduce the glare from a surrounding light source and reflection from the surface on which the eyes are focussed, and/or 2) to enhance the contrast sensitivity of the print or material being focussed upon (generally by means of a yellow filter).

Other apparatus can be used to magnify the image on a computer screen, thereby reducing the degree to which a user's eyes must focus small images. Such apparatus may employ 1) one or more Fresnel lenses, and/or 2) low plus lenses which also have magnifying effect, usually ranging from +0.50 to +0.75 spherical diopetre power.

It is an object of the present invention to provide an apparatus and method for reducing or avoiding ocular muscular fatigue in such circumstances.

According to a first broad aspect of the present invention there is provided an apparatus for avoiding ocular muscular fatigue comprising:

a binocular light converging means for converging incident light, thereby reducing ocular convergence demand when the apparatus is worn by a user.

Thus, the extent to which the eyes of a user of a computer

or reader of any text material must converge owing to the proximity of that computer or other text material (or other apparatus) is reduced by the apparatus according to the present invention, which performs part or much of the required convergence by means of refraction. The eyes of the user may thereby be directed generally forward and parallel, even though the user is reading material or operating a computer or other apparatus whose proximity would normally require a convergence of as much as 15° or more.

Preferably the binocular light converging means is integral.

Thus, the binocular light converging means may comprise a pair of optical elements (such as lenses) but these are preferably formed integrally.

Preferably the binocular light converging means is of polycarbonate, acrylic or some other polymeric plastic material.

Although the, for example, lenses may be made glass, it would generally be cheaper and more convenient to construct them from a plastic material, which will also be less vulnerable to breakage.

Preferably the binocular light converging means is a magnifying binocular light converging means.

Thus, the apparatus, in addition to reducing the required ocular convergence, may also magnify the user's view.

Preferably the binocular light converging means includes or is additionally at least one colour filter.

Preferably the at least one colour filter reduces the

intensity of transmitted yellow light.

Thus, any benefits of reducing particular colour intensities may be combined with those of the convergence according to the present invention.

Preferably the binocular light converging means is provided in the form of a pair of optical elements and the apparatus includes adjustment means whereby the separation of the optical elements may be adjusted according to pupil separation of a user.

Thus, the apparatus may be adjusted so that the optical elements are positioned accurately relative to each eye of a user.

Preferably the light converging means comprises two lenses.

Thus, although the light converging means are preferably lenses, any suitable alternative may be employed, including prisms.

Preferably each of the lenses comprises an optical wedge with a base, wherein the bases of the lenses are adjacent thereby forming base-in prisms.

Preferably the optical wedges are spherical optical wedges.

Thus, the lenses are preferably formed from blanks of spherical form, but thicker at one extremity relative to the other to provide the properties of an optical wedge.

Preferably the lenses are 0.20 to 10 base lenses, more preferably 0.25 to 1.5 base lenses, and still more preferably approximately 0.5 base lenses.

Thus, lenses of higher base may be used but in normal use 2



or 3 base lenses may provide excessive convergence.

Preferably the lenses are additionally prescription lenses.

5 Thus, the convergence effect of the apparatus according to the present invention may be combined with a corrective prescription to provide prescription glasses that also provide the convergence according to the present invention.

10 Preferably the lenses are provided as a pair of spectacles.

According to a second broad aspect of the present invention there is provided a method for reducing ocular muscular fatigue due to convergence demand comprising converging  
15 light prior to the light's incidence on a user's eyes.

Preferably the light is converged by means of a pair of optical elements.

20 Preferably the optical elements are integral with each other.

Preferably the optical elements are of a polycarbonate or other polymeric plastic material.

25 Preferably the optical elements are magnifying optical elements.

Preferably the light is converged by means of two lenses.  
30

Preferably each of the lenses comprises an optical wedge with a base, wherein the bases of the lenses are adjacent thereby forming base-in prisms.

35 Preferably the optical wedges are spherical optical wedges.

Preferably the lenses are 0.20 to 10 base lenses.

Preferably the lenses are 0.25 to 1.5 base lenses.

Preferably the lenses are approximately 0.5 base lenses.

Preferably the lenses are additionally prescription lenses.

Preferably the optical elements are additionally colour filters.

Preferably the optical elements reduce the intensity of transmitted yellow light.

Preferably the method includes adjusting the separation of the optical elements according to pupil separation of a user.

Preferably the optical elements are provided as a pair of spectacles.

It should be noted that the convergence of light produced by the apparatus or method according to the present invention will reduce the convergence demand on the user's eyes and thereby increase the divergence of the users eyes.

The present invention also provides a pair of spectacles for avoiding ocular muscular fatigue comprising:

a pair of convergent lenses for converging incident light, thereby reducing ocular convergence demand when the spectacles are worn by a user.

Preferably each of the lenses comprises an optical wedge with a base, wherein the bases of the lenses are adjacent thereby forming base-in prisms.

Preferably the optical wedges are spherical optical wedges.

Preferably the lenses are 0.20 to 10 base lenses, more preferably 0.25 to 1.5 base lenses and still more preferably approximately 0.5 base lenses.

5 Preferably the lenses are integral with each other.

Preferably the lenses are magnifying lenses.

10 Preferably the spectacles are additionally prescription spectacles.

Preferably the spectacles include, or the lenses additionally comprise, one or more colour filters, and preferably the one or more colour filters reduce the  
15 intensity of transmitted yellow light.

Preferably the spectacles are provided with adjustment means whereby the lenses' separation may be adjusted according to pupil separation of a user.

20 Preferred embodiments of the invention will be described, by way of example, with reference to the accompanying drawings in which:

Figure 1 is a view of a pair of spectacles in  
25 accordance a preferred embodiment of the present invention;

Figure 2 is a cross-sectional view through II-II of Figure 1;

Figure 3 is a view of a pair of spectacles according to a further embodiment of the present invention;  
30 and

Figure 4 is a cross-section through IV-IV in Figure 3.

A pair of spectacles according to a preferred embodiment of  
35 the present invention is shown generally at 10 in Figure 1. The spectacles 10 have right and left lenses 12 and 14 respectively. Lenses 12 and 14 are polycarbonate or

## THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An apparatus for avoiding ocular muscular fatigue comprising:

5           a binocular light converging means for converging incident light, thereby reducing ocular convergence demand when said apparatus is worn by a user.

10          2. An apparatus as claimed in claim 1, wherein binocular light converging means is integral.

15          3. An apparatus as claimed in either claim 1 or 2, wherein said binocular light converging means is of polycarbonate, acrylic or some other polymeric plastic material.

4. An apparatus as claimed in any one of the preceding claims, wherein said binocular light converging means is a magnifying binocular light converging means.

20          5. An apparatus as claimed in any one of the preceding claims, wherein said binocular light converging means includes or is additionally at least one colour filter.

25          6. An apparatus as claimed in claim 5, wherein said at least one colour filter reduces the intensity of transmitted yellow light.

30          7. An apparatus as claimed in any one of the preceding claims, wherein said binocular light converging means is provided in the form of a pair of optical elements and said apparatus includes adjustment means whereby the separation of the optical elements may be adjusted according to pupil separation of a user.

35          8. An apparatus as claimed in any one of the preceding claims, wherein said light converging means comprises two lenses.

9. An apparatus as claimed in claim 8, wherein each of said lenses comprises an optical wedge with a base, wherein said bases of said lenses are adjacent thereby forming  
5 base-in prisms.

10. An apparatus as claimed in claim 9, wherein said optical wedges are spherical optical wedges.

10 11. An apparatus as claimed in any one of claims 8 to 10, wherein said lenses are 0.20 to 10 base lenses.

12. An apparatus as claimed in claim 11, wherein said lenses are 0.25 to 1.5 base lenses.

15 13. An apparatus as claimed in claim 12, wherein said lenses are approximately 0.5 base lenses.

14. An apparatus as claimed in any one of claims 8 to 13,  
20 wherein said lenses are additionally prescription lenses.

15. An apparatus as claimed in any one of claims 8 to 14, wherein the lenses are provided as a pair of spectacles.

25 16. A method for reducing ocular muscular fatigue due to convergence demand comprising converging light prior to said light's incidence on a user's eyes.

17. A method as claimed in claim 16, wherein said light is  
30 converged by means of a pair of optical elements.

18. A method as claimed in claim 17, wherein said optical elements are integral with each other.

35 19. A method as claimed in either claim 17 or 18, wherein said optical elements are of a polycarbonate or other polymeric plastic material.

20. A method as claimed in any one of claims 17 to 19, wherein said optical elements are magnifying optical elements.

5

21. A method as claimed in any one of claims 17 to 20, wherein said optical elements are a pair of lenses.

10

22. A method as claimed in claim 21, wherein each of said lenses comprises an optical wedge with a base, wherein said bases of said lenses are adjacent thereby forming base-in prisms.

15

23. A method as claimed in claim 22, wherein said optical wedges are spherical optical wedges.

24. A method as claimed in any one of claims 21 to 23, wherein said lenses are 0.20 to 10 base lenses.

20

25. A method as claimed in claim 24, wherein said lenses are 0.25 to 1.5 base lenses.

26. A method as claimed in claim 25, wherein said lenses are approximately 0.5 base lenses.

25

27. A method as claimed in any one of claims 21 to 26, wherein said lenses are additionally prescription lenses.

30

28. A method as claimed in any one of claims 17 to 27, wherein said optical elements are additionally colour filters.

29. A method as claimed in claim 28, wherein said optical elements reduce the intensity of transmitted yellow light.

35

30. A method as claimed in any one of claims 17 to 29, wherein the method includes adjusting the separation of the

optical elements according to pupil separation of a user.

31. A method as claimed in any one of claims 17 to 30,  
wherein the optical elements are provided as a pair of  
5 spectacles.

32. A pair of spectacles for avoiding ocular muscular  
fatigue comprising:

10 a pair of convergent lenses for converging  
incident light, thereby reducing ocular convergence demand  
when said spectacles are worn by a user.

33. A pair of spectacles as claimed in claim 32, wherein  
each of said lenses comprises an optical wedge with a base,  
15 wherein said bases of said lenses are adjacent thereby  
forming base-in prisms.

34. A pair of spectacles as claimed in claim 33, wherein  
said optical wedges are spherical optical wedges.

20 35. A pair of spectacles as claimed in any one of claims  
32 to 34, wherein said lenses are 0.20 to 10 base lenses.

36. A pair of spectacles as claimed in claim 35, wherein  
25 said lenses are 0.25 to 1.5 base lenses.

37. A pair of spectacles as claimed in claim 36, wherein  
said lenses approximately 0.5 base lenses.

30 38. A pair of spectacles as claimed in any one of claims  
32 to 37, wherein said lenses are integral with each other.

39. A pair of spectacles as claimed in any one of claims  
32 to 38, wherein said lenses are magnifying lenses.

35 40. A pair of spectacles as claimed in any one of claims  
32 to 39, wherein said spectacles are additionally

prescription spectacles.

41. A pair of spectacles as claimed in any one of claims  
32 to 40, wherein spectacles include, or said lenses  
5 additionally comprise, one or more colour filters.

42. A pair of spectacles as claimed in claim 41, wherein  
said one or more colour filters reduce the intensity of  
transmitted yellow light.

10

43. A pair of spectacles as claimed in any one of claims  
32 to 42, wherein the spectacles are provided with  
adjustment means whereby the lenses' separation may be  
adjusted according to pupil separation of a user.